GENERAL LIBRARY,
UNIV. OF MICH.
NOV 8 1910

THE AMERICAN MUSEUM JOURNAL

1831
1884
JONATHAN THORNE
ENDOWMENT FUND FOR THE BENEFIT OF THE BLIND
BEQUEATHED BY PHEBE ANNA THORNE - 1910
IN MEMORY OF HER FATHER

BRONZE BAS RELIEF BY CHESTER BEACH

Volume X November, 1910 Number 7

Published monthly from October to May inclusive by
THE AMERICAN MUSEUM OF NATURAL HISTORY
NEW YORK CITY

American Museum of Natural History

Seventy-seventh Street and Central Park West, New York City

BOARD OF TRUSTEES

President
HENRY FAIRFIELD OSBORN

First Vice-President
J. PIERPONT MORGAN

Second Vice-President
CLEVELAND H. DODGE

Treasurer
CHARLES LANIER

Secretary
J. HAMPDEN ROBB

Ex Officio

THE MAYOR OF THE CITY OF NEW YORK
THE COMPTROLLER OF THE CITY OF NEW YORK
THE PRESIDENT OF THE DEPARTMENT OF PARKS

Class of 1910

J. HAMPDEN ROBB
ARTHUR CURTISS JAMES
PERCY R. PYNE
JOHN B. TREVOR
J. PIERPONT MORGAN, JR.

Class of 1911

CHARLES LANIER
ANSON W. HARD
WILLIAM ROCKEFELLER
GUSTAV E. KISSEL
SETH LOW

Class of 1912

ALBERT S. BICKMORE
ADRIAN ISELIN, JR.
THOMAS DEWITT CUYLER
OGDEN MILLS

Class of 1913

GEORGE S. BOWDOIN
A. D. JUILLIARD
CLEVELAND H. DODGE
ARCHER M. HUNTINGTON
FELIX M. WARBURG

Class of 1914

JOSEPH H. CHOATE
HENRY F. OSBORN
J. PIERPONT MORGAN
JAMES DOUGLAS
GEORGE W. WICKERSHAM

EXECUTIVE OFFICERS

Director
HERMON C. BUMPUS

Assistant-Secretary and Assistant-Treasurer
GEORGE H. SHERWOOD

THE AMERICAN MUSEUM OF NATURAL HISTORY was established in 1869 to promote the Natural Sciences and to diffuse a general knowledge of them among the people, and it is in cordial coöperation with all similar institutions throughout the world. The Museum authorities are dependent upon private subscriptions and the dues from members for procuring needed additions to the collections and for carrying on explorations in America and other parts of the world.

The membership fees are,

Annual Members	$ 10	Fellows	$ 500
Sustaining Members (Annual)	25	Patrons	1000
Life Members	100	Benefactors (Gift or bequest)	50,000

All money received from membership fees is used for increasing the collections and for developing the educational work of the Museum.

The Museum is open free to the public on every day in the year.

A DETAIL OF THE FLAMINGO GROUP

Protective coloration evidently plays no part in the lives of adult flamingoes. They are protected by the nature of their haunt and by excessive wildness

The American Museum Journal

Vol. X NOVEMBER, 1910 No. 7

PROTECTIVE COLORATION IN THE HABITAT GROUPS OF BIRDS

WHILE the habitat groups of birds make their strongest appeal to most Museum visitors through the universal love of the beautiful, it must not be forgotten that mounted specimens placed in a natural setting permit study of the animal in relation to its environment. The origin of the name "snake-bird," for example, as applied to the Anhinga is at once obvious when one sees in the group representing this species the bird swimming with the body submerged and only the slender sinuous snake-like neck and head exposed. The wading stilt, betraying the function of the exceptionally long legs, and the feeding flamingo, with upturned bill pressed into the mud, also illustrate the importance of natural surroundings for exhibition specimens.

The necessity of seeing the bird in its natural habitat is particularly evident when one attempts to explain the relation between the color of an animal and its immediate environment. Nearly every one of the habitat groups of birds will present some evidence in support of this fact. Let us look, for example, at the first group to the right as we enter the hall. It is based on studies made on Cobb's Island, Virginia, and contains, among other birds, numerous black skimmers with their newly hatched young. Several of the latter, mounted directly from photographs from life, are shown in the pose they assume at the command of the parent in the presence of danger, and are so flattened out against the sand that they seem almost to fuse with it; even in the group they are remarkably inconspicuous, while in life they are almost invisible.

The inquiring visitor noting this fact will doubtless ask, how then is the correspondingly conspicuous black plumage of the adult bird to be explained; assuredly it is not protective, and a reply to the question is that the adult skimmer avoids observation by excessive wariness. Up to the time the studies for this group were made, no naturalist appears to have seen a skimmer on its nest, and it was currently believed that the bird sat upon its eggs only during the night. Observations and photographs made from a blind showed that the skimmer returned to the little hollow in the sand in which its eggs were laid, just as soon as it felt that it was not under

WHITE-TAILED PTARMIGAN IN SUMMER PLUMAGE

A portion of the Arctic-Alpine group. The female ptarmigan is protectively colored; she will allow herself to be touched before deserting the nest

observation. Indeed a thermometer would doubtless have proved the necessity of the bird's presence if its eggs were not to be cooked by the noon-day rays of a July sun.

Passing by the groups arranged along the side of the hall, each one of which has a biologic story of its own, we journey from the Atlantic to the Pacific and find the case of the skimmer practically repeated by the black-necked stilt in the San Joaquin Valley group. Here again is a conspicuous black and white parent, while the downy young wear an admirably disguising costume, which persists even to the plumage of flight worn by the half-grown stilt which is squatting in the vegetation at the water side. Note also in this group how effectively the color of the downy black tern in the foreground blends its wearer with the details of its nest.

This San Joaquin group contains a further illustration of protective coloration in the cinnamon teal and ruddy duck. When molting, these birds, in common with grebes, murres and other diving birds, lose all their wing quills simultaneously and are consequently flightless until new ones are acquired. Apparently, therefore, to aid in their concealment during this comparatively helpless period, the males shed the more striking portions of their distinctive plumage which is replaced by a dull, neutral-tinted plumage like that of the female. This is worn only until they reacquire

A SMALL PORTION OF THE SNAKE-BIRD HABITAT GROUP

The origin of the name appears when one sees the bird swimming with only the head and the slender sinuous neck exposed

the power of flight when their full male costume is regained. The disguise, as it were, known as the "eclipse plumage" is well shown indeed by the cinnamon teal and ruddy duck in the San Joaquin group.

At the same end of this hall, but on the west side, is situated the really startling flamingo group. Protective coloration evidently plays no part in the lives of adult flamingoes, whatever it may do for their young, and these flaming creatures, which, as the birds in the background show, can be seen at a great distance, are protected by the nature of their haunts which permit them to see as well as be seen long before an enemy could reach them, in connection with a wildness which makes it impossible to approach near them without the exercise of the utmost caution, and that under favoring conditions. Furthermore, these brilliant birds are most abundant only on islets uninhabited by predatory mammals and where they find in abundance the small shells on which they mainly subsist.

Only one additional instance will be cited to illustrate further the value of these groups in connection with a study of the colors of birds. It will be found in the Arctic-Alpine group from the summit of the Canadian Rockies where white-tailed ptarmigan in summer plumage can scarcely be seen amid the heather and the lichen-covered rocks. A seasonal group at the entrance to the main bird hall below shows clearly how the plumage of this bird, keeping pace in its changes with the variations in its surroundings, prevents its wearer from ever becoming a shining mark for the numerous foes to whose attacks it is subject, but the group in question shows only the summer home and summer plumage of the birds, and it is especially significant to know that the female, found sitting on the nest here shown, actually permitted herself to be touched before deserting her eggs. Compare her actions with those of the skimmer, which avoids even being seen on its nest, and we have a convincing demonstration by the birds themselves of what constitutes a protective and what a non-protective plumage.

FRANK M. CHAPMAN

A NEW FIELD FOR MUSEUM WORK

THAT the Museum has created a Department of Public Health emphasizes its aim to develop scientific work along practical lines directly beneficial to the masses of the people. That it has placed at the head of this department a man whose previous work and interest have centered largely in problems of city water supply and sewage disposal comes with peculiar fitness at just this moment when for the past two months the water supplies in and about New York have been deficient in quantity and questionable in quality. Professor Winslow plans to build

up the new department along two somewhat distinct lines, bacteriology and municipal sanitation.

There is at present no comprehensive collection of bacteria in this country and workers who desire authentic cultures must send to Prag for them unless a neighboring laboratory happens to have the particular organism desired. In the bacteriological laboratory now being equipped at the Museum, the new Department will install and keep under cultivation a complete collection of bacteria, securing material from colleges and board of health laboratories in this country and in Europe. The Museum will thus be in a position to act as a central bureau for the distribution of bacteria, supplying the needs of corresponding laboratories and of schools and other institutions which may occasionally desire cultures. Such a bacteriological collection when established will furnish also an exceptional opportunity for studies of the systematic relationships of this group in which a better biological classification is greatly needed.

The public exhibits of the Department will deal chiefly with phases of municipal sanitation. The central idea will be to set forth some of the conditions which affect the life of the human animal in that form of commensalism which we call a city. Temporary exhibits will be prepared to illustrate the history and development of the more important phases of city life. For example, the first of these exhibits will deal with the problem of water supply sanitation, illustrating by models and specimens as well as by photographs and charts, the sources of water, its collection for public use, the danger of infection, the development of microscopic algæ and protozoa in reservoirs, methods adopted for purification and resulting effects upon the public health. The history and development of the present and future sources of water supply of New York — an engineering undertaking second only in magnitude to that of the Panama Canal — will be graphically represented. The chief features of these temporary exhibits will be preserved for a permanent exhibit of Public Health, such as several German cities now possess, but of which there is no example in the United States.

Professor Winslow comes to the Museum from ten years of service in the Massachusetts Institute of Technology, where since 1905, he has been Assistant Professor of Sanitary Biology. In 1903, he was appointed Biologist-in-charge of the Sanitary Research Laboratory and Experimental Station, founded by the Institute at that time for the study and dissemination of knowledge with regard to sanitary questions. Professor Winslow was also Assistant Health Officer in Montclair, New Jersey, during the summer of 1898 and did special work in the Engineer's Office of the Massachusetts State Board of Health during the summers of 1899–1902. He has

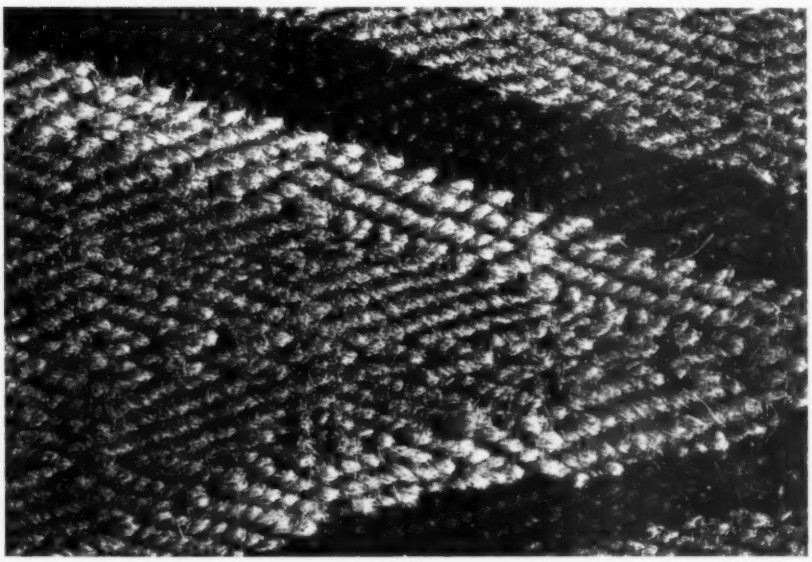
been an extensive contributor to the medical, technical and scientific press on the subjects of bacteriology of water, ice and air, the purification of sewage and the causation of typhoid fever. His investigations on the purification of Boston sewage, carried on at the Sanitary Research Laboratory, have led to important practical applications at many of the plants in this country and in Canada.

Professor Winslow has been more or less actively associated with socio-

PROFESSOR C-E. A. WINSLOW OF THE DEPARTMENT OF PUBLIC HEALTH

He will build up an exhibit dealing with the problems of New York's water supply and with other sanitary aspects of city life

logical interests in Boston, particularly in relation to movements for better factory conditions and improvements in the milk supply. It was mainly through his efforts that the system of factory inspection in Massachusetts was remodelled two years ago by the creation of district medical inspectors, acting under the Board of Health and having supervision of all questions of factory inspection. In our own section he is already known for his expert services extended in connection with lawsuits relating to the water supply of New Jersey.



SECTION OF A SADDLE BLANKET, LENDERS' COLLECTION

It shows the diagonal or twilled weave conforming to the color design, a white and black diamond on a rose ground

NAVAJO BLANKETS

THE Navajo, the Indian blanket-makers of the Southwest, occupy a large portion of northern Arizona and New Mexico. In language, they are of the Athapascan stock and therefore are connected with the various Apache tribes to the east and south with whom, in fact, they are able with difficulty to carry on conversation. The Hopi, a Pueblo people, have their homes on the mesas to the west.

The Navajo are the only natives of North America who have become a

pastoral people. When first visited by the Spanish explorers in 1540, they were already agriculturalists. During the seventeenth, eighteenth and early part of the nineteenth century, the Navajo were given to raiding their Mexican neighbors much after the manner of the Apache. It is probable that at first the mules, burros, cattle and sheep procured on these raids were killed and consumed immediately, but that later they were retained and allowed to breed. The combination of a pastoral and an agricultural life in a semi-arid region requires not only a vast acreage but much travelling. The corn is grown along the stream beds, the crop being matured, if the gods are good, by showers in late summer. The sheep must be moved from range to range as the seasons change. The herding of the flocks usually falls to the children who are assisted in times of difficulty by the older members of the family. Only during the winter is a house really necessary; at other seasons, the family lives under the shelter of a tree or rock. The Navajo have become a wealthy people with their half million of sheep, doubly so since much of the wool, by the skill, industry and unlimited patience of the women, is woven into blankets.

Blanket-making is now the chief art of the Navajo. It seems probable that formerly they made a variety of baskets and that methods of dyeing and the designs were transferred to the blankets as the art of basket-making declined. Many of the men are expert silversmiths showing not only skill but excellent taste. The Navajo are not the unpoetic, unimaginative people they appear, for they have a great wealth of ceremony with songs, prayers, and complicated graphic art.

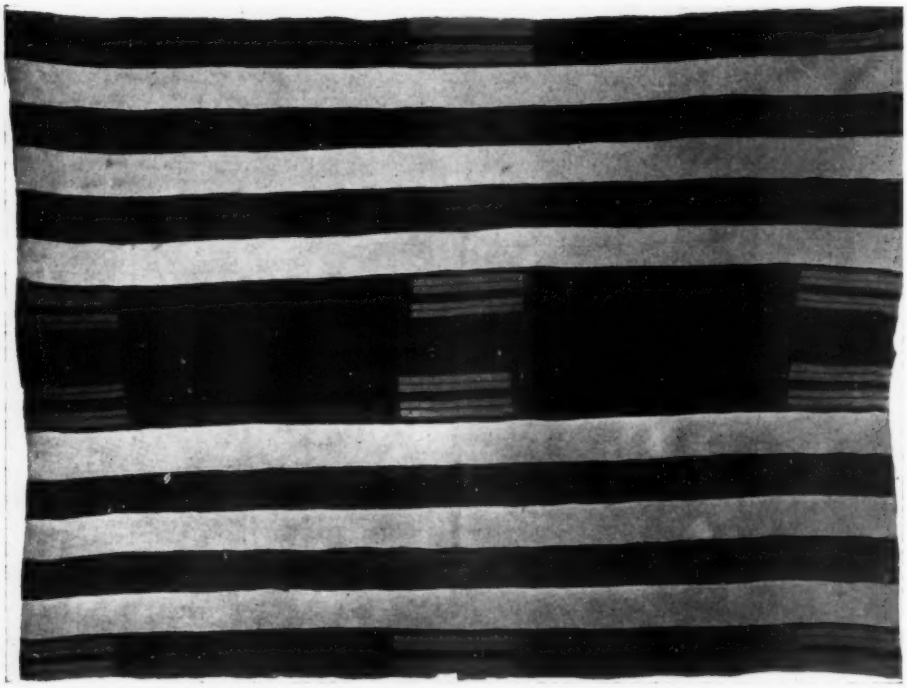
Beginnings in Navajo Weaving

The history of the Navajo shows the adaptability of a race to meet and take advantage of new conditions and to imitate and develop the customs of neighboring races. It is especially interesting to look at this history in connection with weaving, since the beginning of the manufacture of cloth by any race is always a milestone in development, clothes giving a more emphatic impression of the status of a people than any other one item in their culture. There was considerable weaving done in North America before 1492, the date of the landing of Columbus. From the cliff-dwelling Pueblo area of New Mexico and Arizona southward to Peru, cotton was cultivated, spun and woven into cloth. Specimens recovered from the extremes of this territory indicate that a high state of perfection had been reached. Also in another area, the Northwest, the Chilcat and other tribes made blankets from the hair of the mountain goat, where, however, the

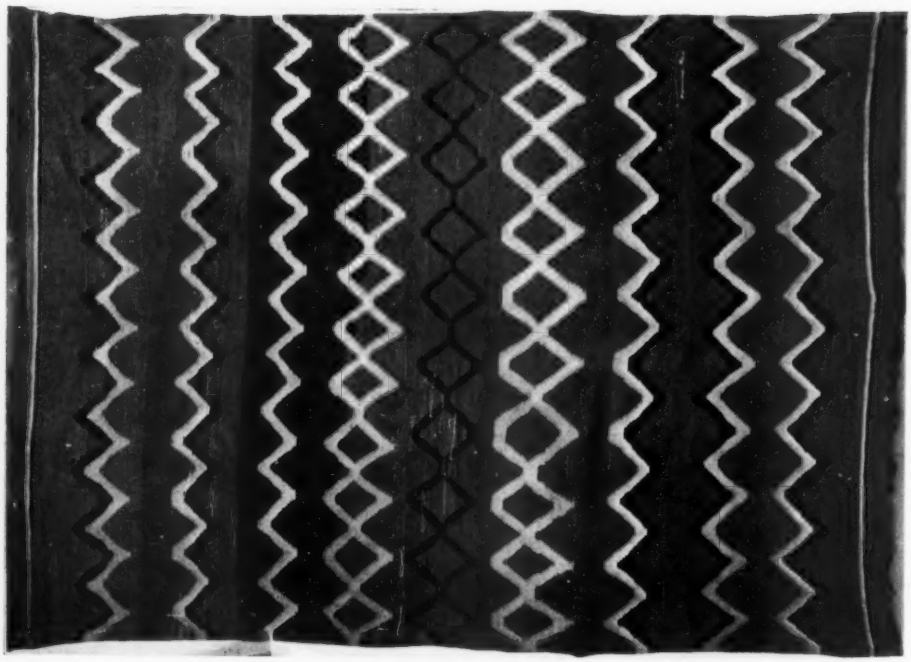
203

NAVAJO SUMMER HOME

A blanket just begun is in position for work



CHIEF'S BLANKET OF THE LENDERS' COLLECTION



THE GEM OF THE LENDERS' COLLECTION

Indigo blue and white design on a body of bayeta red, the bayeta ravelled from five different pieces of cloth

most simple form of loom was used, the work being done entirely by hand as in basketry. Again, in the eastern portion of North America, belts and other small articles were woven from Indian hemp and from buffalo, bear and moose hair. The Navajo, however, in early times, seem not to have raised cotton nor to have woven blankets, although their Indian neighbors, the Hopi, are known to have done so.

Method of Weaving

The spindles and looms used by the Navajo are so similar to those employed by the Indians of this region and farther south one is justified in supposing that in some respects the art was borrowed, but certainly not from Europeans since the differences are too great to be reconciled with any direct teaching by the Spanish. Judging from the general character of the product and the designs employed, one must believe that to a very great extent, the Navajo have developed for themselves their unsurpassed art.

The wool is sorted, spread out on a sloping stone and then washed by pouring hot water containing an extract of the yucca root over it. The carding is done with a pair of ordinary European hand cards and there is no evidence of a primitive means ever having been employed. The spindle, however, is the same as that found in cliff ruins. It consists of a small stick at the base of which is a wooden disk to give momentum and facilitate the winding of the yarn.

The loom is a simple frame in which the warp is placed vertically. The weaving is done beginning at the bottom, the

NAVAJO WOMAN SPINNING WOOL

The spindle is very like those found in the prehistoric cliff-dwellings in the Southwest

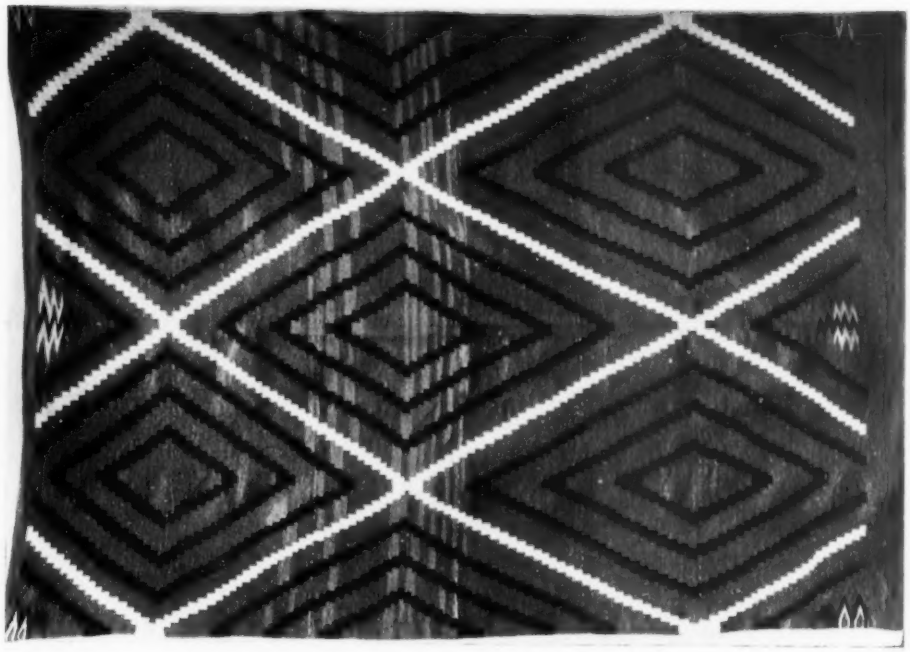
WEAVING A NAVAJO BLANKET

Insuring a close weave by beating down the woof with a batten. Both implement and method are characteristic of the Southwest

blanket being lowered as the work progresses. No shuttle is used, the yarn is inserted with the fingers or by the aid of a small stick. The woof is forced down by pressure with a fork or by the blow of a batten stick. The weaving of North America is peculiar in that the woof strands of a particular color are not carried entirely across the blanket, but only as far as that color is required for the design. It is then dropped and another color taken up.

Colors of Navajo Blankets

The colors employed are the natural white and brown of the well-washed wool, a gray which results from the mingling of these, and various native and commercial dyes. Some of these were almost certainly employed by the Navajo in basket-making. Black they produced by combining a concoction of sumac (*Rhus aromatica*), roasted ocher and piñon gum. Dull red was obtained by placing the yarn in a liquid made by boiling in water the bark of alder and mountain mahogany. Lemon yellow was secured by the use of the yellow flowers of the shrubby *Bigelovia graveolens* and a native alum. Old gold resulted from rubbing into the wool a paste made of sorrel roots and crude alum ground together. In rather early days indigo blue was obtained from the Mexicans and displaced native blue. A bright scarlet and a rose color were obtained in the early history of blanket-making by ravelling woolen cloth obtained from Europeans. Blankets containing such material are called "bayeta" from the Spanish name of

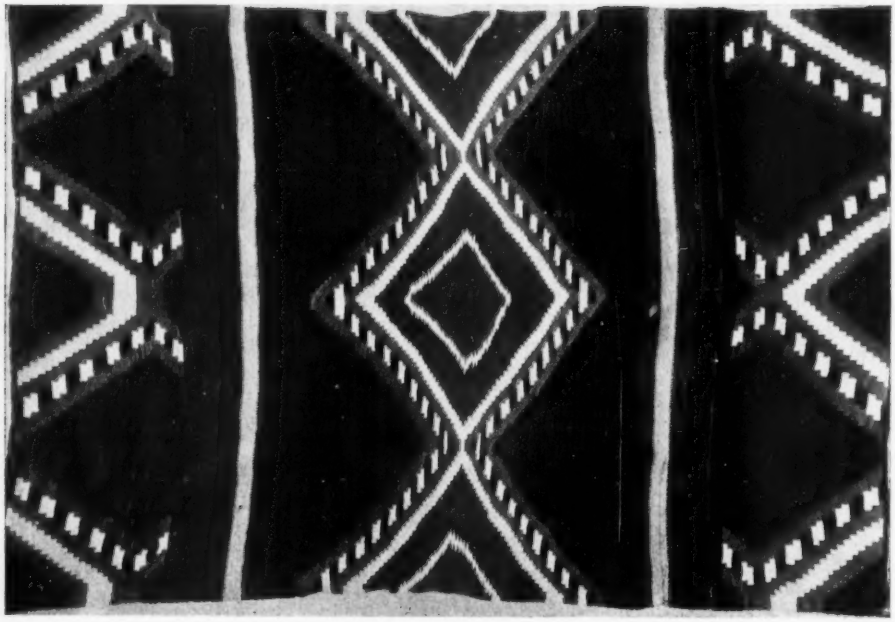


AN ATTRACTIVE BLANKET IN THE SAGE COLLECTION

Background of red, broken in the middle by irregular stripes of lighter color; diamond pattern in dark blue and white

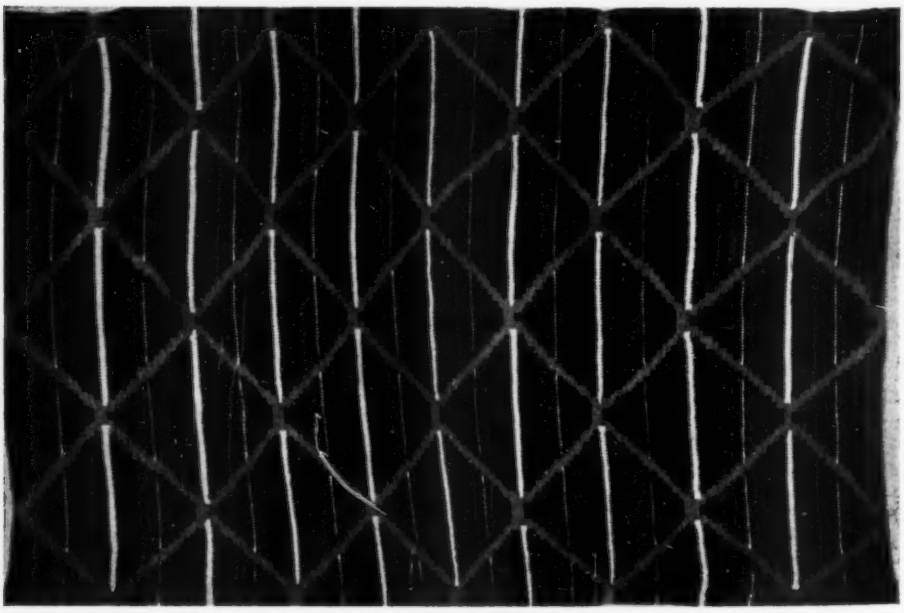
NAVAJO WOMAN'S DRESS

A blanket of black and bayeta red. Sage Collection



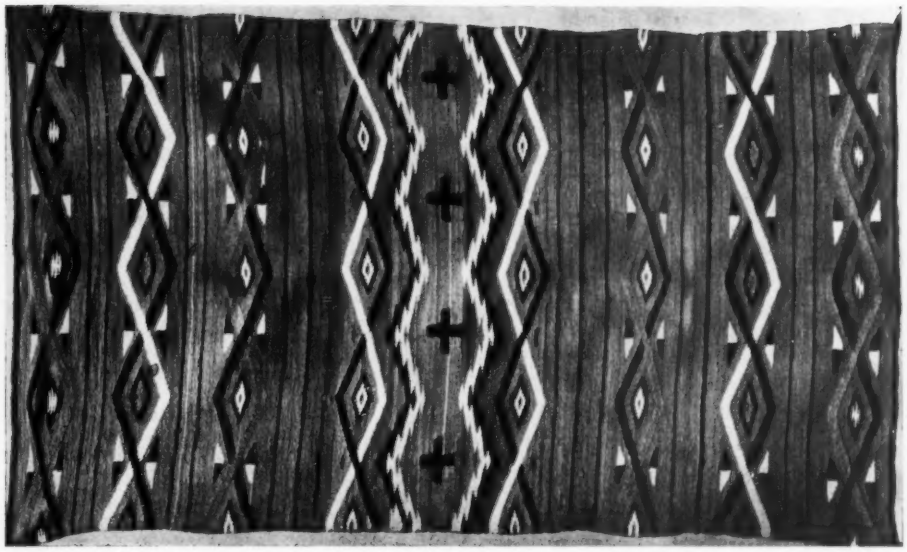
NAVAJO BLANKET OF THE SAGE COLLECTION

Background of blue and black; a diamond in red as a central design; rose colored bands between middle and end figures



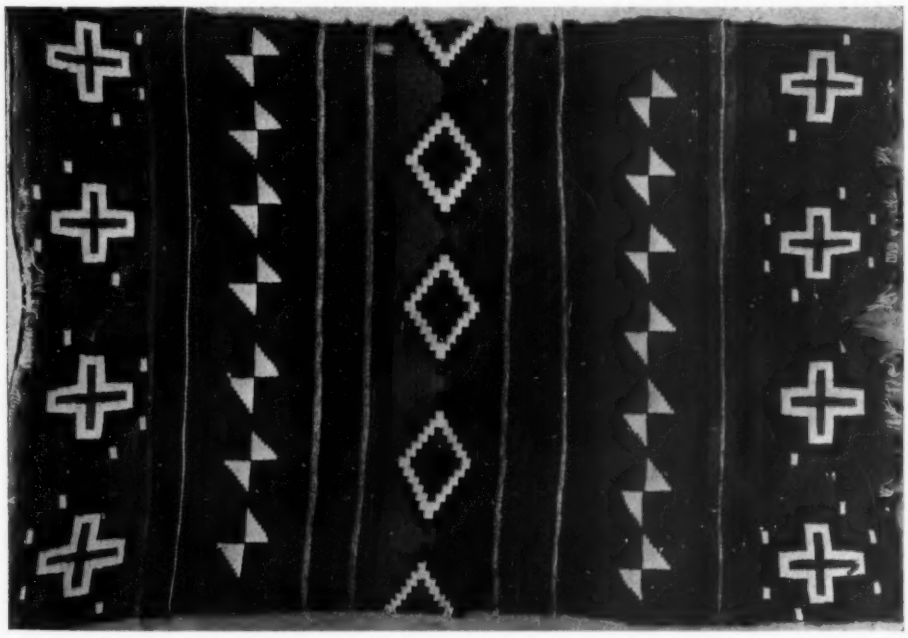
A VALUABLE BLANKET, SAGE COLLECTION

A design of red and white on a background made up of narrow blue and black stripes



A BEAUTIFUL SADDLE BLANKET FROM THE SAGE COLLECTION

The background is red, the complicated design dark blue, yellow and white. This blanket is unusually fine in weave



A VALUABLE OLD NAVAJO BLANKET

Designs in white and indigo blue on a background of red. Sage Collection

flannel used in the soldiers' uniforms. It is to be regretted that in recent years aniline dyes have superseded native ones. At the present time an effort is being made by the traders in the Navajo country to secure the use of native dyes again or of more permanent commercial dyes.

Navajo Designs

Since blanket weaving is of comparatively recent origin among the Navajo, the source of designs is a matter of considerable interest. It is yet to be determined how far these patterns are a natural growth coördinate with the development of Navajo weaving, in how far they have been taken over from Navajo basketry, and to what extent they have been influenced by Pueblo and Spanish neighbors. The earlier examples of Navajo weaving often have broad stripes, closely resembling the blankets made by the Hopi. Later many geometrical figures appear, standing alone, or combined with horizontal and vertical stripes or with each other. The general arrangement is usually symmetrical, but both the completed pattern and the individual designs lack the exactness of machine work.

The more common designs are squares, parallelograms, diamonds and triangles. Diamonds are often formed by intersecting diagonal lines which run across the blanket, half diamonds resulting at the sides. The outlines of the figures in many cases are broken with right angles, that is, made to consist of a series of steps. These designs have Navajo names descriptive of them, such as "sling" for the elongated diamond, "three points" for the triangle. The ordinary diamond is called "star large," by which the morning star is meant. This and the zigzag line representing lightning and triangular masses called clouds have more or less religious connotation and may be symbolic in their intention. The swastika, a primitive cross-like form, which is now often seen on blankets has recently been introduced in response to the commercial demand for it.

Kinds of Navajo Blankets

The Navajo wove at first to secure clothing and blankets for their own use. The women's garment consisted of two rectangular pieces of cloth partly sewed together on the sides and one end, openings being left for the neck and arms. The fashion required that the middle portion of each piece be black with a broad band of red at each end relieved by narrow stripes and small designs in black or blue. This red is in many cases bayeta because the women's dress has not been much worn since the use of bayeta has been superseded by Germantown and commercial dyes. A single large rectangular blanket was used to wrap around the body. These

are called "Chief's blankets" and are distinguished by a peculiar arrangement of designs. The body of the blanket is made in broad stripes. On this as a background, a rectangular design is woven in the center with one half of the same design midway on each side and one quarter of it in each corner. These blankets are valuable because they were woven with care from finely spun yarn and because they usually date from the period of bayeta and the better dyes. The Navajo now prefer to wear the trader's blanket since it is lighter in weight and more gorgeous in colors and designs.

From the collector's and blanket lover's standpoint, there are four groups into which Navajo blankets fall. The most valued are those containing bayeta which have not been made since about 1875. Next stand those which consist entirely of wool in the natural color or dyed only with native dyes. Thirdly, many blankets of excellent workmanship and pleasing designs have been woven from Germantown yarn, ready spun and dyed; and finally, the common modern product too often the result of aniline and other commercial dyes.

Navajo Blankets Recently Acquired

In the Lenders' collection presented to the Museum by Mr. J. Pierpont Morgan, there are twenty-five Navajo blankets, eleven of which contain bayeta yarn, five of the eleven being also chief's blankets. The gem of this collection is about two yards long and a yard and a half wide and has the body of bayeta red, material ravelled from five different pieces of cloth.

Mrs. Russell Sage during a recent visit to the Southwest and California purchased two collections of blankets. One of these belonged to A. C. Vroman of Pasadena, California, and had been made by him with rare taste and judgment. It is mostly composed of the very best examples of earlier Navajo weaving. Thirteen blankets of this collection were given to this Museum, others to the Metropolitan Museum of Art. The second collection was obtained from Fred Harvey, well-known through his connection with the Santa Fé railroad system. It consists of six Navajo blankets in addition to specimens of Hopi, Chimayo and Saltillo weaving. This collection as a whole has been presented to the Museum.

A few months ago the Museum had no blankets worthy of mention and the situation was a discouraging one, for good blankets are obtained only by bountiful means and by the exercise of a critical judgment acquired through years of experience. These three collections brought into the possession of the Museum through the generosity of Mrs. Russell Sage and Mr. J. Pierpont Morgan have already supplied the need hardest to meet, that of the oldest and best blankets.

Pliny E. Goddard

"TURNING KOGMOLLIK" FOR SCIENCE

Experiences of the Museum's Arctic Expedition

THERE could be no more simply told story of hardship, of high hopes made futile by storm and illness than that recorded in the latest letters from the Museum's Arctic Expedition. The past winter will long be remembered as the "hard times" winter by the two expedition leaders, Messrs. V. Stefánsson and R. M. Anderson, "turned Kogmollik" in the cause of science — "to turn Kogmollik" meaning to join forces with the Kogmollik Eskimos of the Mackenzie delta and eastward, dressing as they do and wandering with them to get a living from the country.

Any man who goes into the Arctics expects the possibility of having to face starvation, unless he takes a ship. It is impossible to carry with dog team or small boat enough to serve for more than a short journey; and if at the end of the journey, game proves scarce or wandering bands of Eskimos cannot be located, retreat from the difficult situation becomes problematic. In such straits Eskimos sometimes have to sacrifice their dogs; but unless worst comes to worst, they take such an adventure as a matter for joking and with whetted courage push on, perhaps in the face of a blizzard and through deep snows. The explanation of the Eskimo's cheerful view of the matter lies largely in his trust in the hospitality of his fellow Eskimos. For in Eskimo character there has evolved great unselfishness and in Eskimo tribal life a rare communism, passing strange and contradictory as it may seem that this should have taken place in a land of cold and privation, opposed to the selfishness and cruelty of most peoples of southern countries where there are physical comfort and plenty. A chief in the Arctics is not appointed or chosen, nor does he inherit his title. He attains it from a reputation for hospitality.

The Stefánsson-Anderson Expedition differs essentially from ordinary Arctic ventures in that whereas it is usual to carry along everything that the party is expected to need during its stay in the field, in this instance, little in the way of food, clothing or house materials was taken. This was the original plan, since the primary aim of the expedition is ethnological. How can a white man become familiar with the real life of primitive peoples, with their language, folk lore and songs, customs, beliefs and ambitions, except by living with them in their houses and as they do? Therefore, the leaders of the Arctic Expedition dress in Eskimo clothes, which weigh no more than a spring suit yet "allow one to sit comfortably on a block of snow, with back to the wind, fishing through a hole in the ice, the tem-

perature being −50° Farenheit, and to feel the cold nowhere but on the face." They eat Eskimo food also, a great acquirement for a white man, and report that since the first month's difficulties they relish all,— raw frozen fish, eaten as one would eat corn from the cob, boiled fish without salt, taken with the fingers, even the Eskimo delicacy of boiled fish heads, and, of course, seal oil, whale blubber and deer meat.

The necessity of existing on such food seems a bad enough state of affairs to one surrounded by the comforts of civilization, but in reading the letters of the expedition's experiences the past winter the imagination is sated with the recounting of one impossible food after another:

> A little Eskimo boy with us was fortunate enough to find the carcass of a caribou which had been killed by wolves. They had eaten only part of the back meat, leaving us enough for three or four good meals....After that was gone we had "whitefish" blubber straight, with the addition of about two spoonfuls apiece of caribou stomach mixed with oil at each meal. Our caribou had carried a peck of well masticated moss and grass in its stomach. Perhaps the stuff did not have much nutritive value for man, but it served as a vehicle for the assimilation of a much greater quantity of oil than we could take straight. I asked the Eskimos to tell me the name of this camping place, as nearly every little creek, hill or promontory has a local name. Nobody knew, but "Jimmy" sardonically suggested that we call it Kak′-wĭ-ă-tuk (the place of no food).

> Ivitkuna killed a fox, which afforded a taste of meat. We also singed the hair off a piece of sealskin, slightly scorching the skin. This made the skin brittle and "chewable" and as a little fat was still adhering it was quite palatable, much better than the scraps of rubbery, raw sealskin we had often forced down our throats before. ....This diet kept us from experiencing actual hunger, but we felt lazy, and weaker every day. Frequent halts were necessary, perhaps fifteen minutes every hour, and we usually fell asleep sitting on the sled at every halt. Everybody was getting pretty thin, but had not been sick at all. I had lost fully twenty pounds in nine days, although still fairly strong.

The expedition took small equipment in supplies, it is true. Yet scan the list of purchases made at Point Barrow on the Alaskan coast. At first blush the perusal is amusing, later enlightening. Of course, there is ammunition; also, bespeaking the needs of the climate there are deerskin coats and various articles such as snow goggles. Lanterns and cases of coal oil anticipate the Arctic winter when the sun does not rise for nearly three months. Naturally the list itemizes dogs: 4 dogs at $15 each, 1 dog $19, 3 dogs $45. But besides all these there are certain frequently recurring items that arouse interest because of the large amounts: 50 lbs. of tea at 35 cents a lb., 20 lbs. of tea at 20 cents a lb., 40 lbs. of tea at 35 cents, and so on; 4 tins of matches $8, 3 tins of matches $6, 2 tins of matches $4, and so on; 100 lbs. black tobacco $50, 8 boxes chewing tobacco $38, 50 lbs. Uncle Ned tobacco $20, and so on and on. The fact develops that

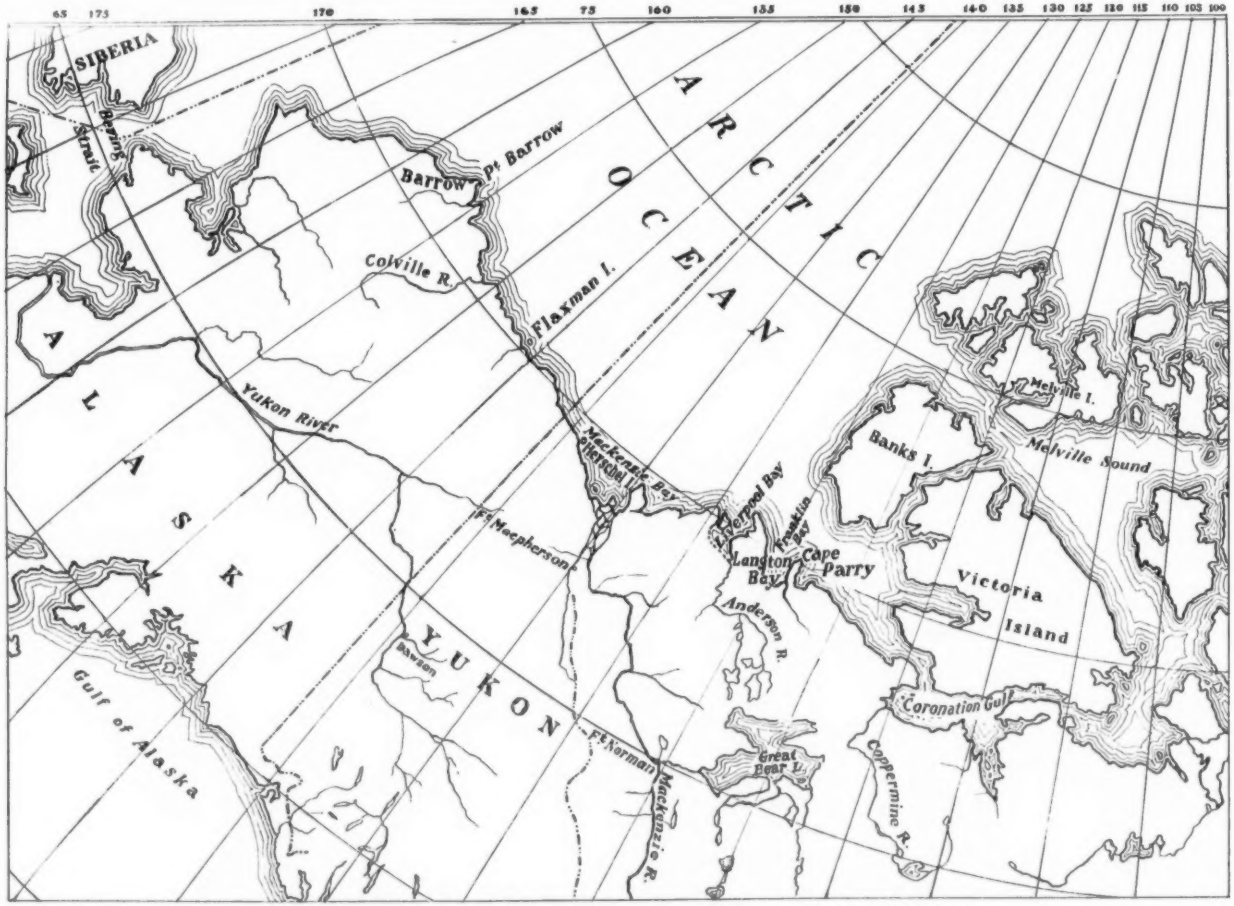
these astounding quantities of matches and tobacco and of tea are not for the members of the expedition, but are to pass slowly into the hands of the Eskimos, being the staple trading medium of the country.

The Arctic Expedition left New York in May, 1908, financed for its work by the American Museum of Natural History and in part by the Geological Survey of the Canadian Government. It proceeded overland to Edmonton, the world's greatest fur market, then two thousand miles northward by the Mackenzie River route to the coast. The final good-by was sent back from Athabasca landing which was the jumping-off place as regarded communication with the Museum. The main object of the expedition is to make a scientific study of little-known Eskimos, especially those tribes east of the Mackenzie River, and to obtain, of course, as much material as possible to illustrate Eskimo life and customs. Secondarily, it is to carry on a zoölogical survey, procuring collections of mammals, birds and fish, this work being in the hands of Dr. Anderson.

In the ethnological work there were plans to investigate two fields, one west of the Mackenzie River, the other east. The "Nunatama," an inland tribe of the Colville are probably least known scientifically among the Eskimos of Alaska because they never trade directly with the white man, getting goods from the Point Barrow Eskimos, who in their turn trade with the Arctic whaling vessels. The greatest interest of the expedition, however, centers in the tribes east of the Mackenzie at Coronation Gulf with its Coppermine River and on Victoria Land north of this. It is known that here are opportunities to study tribes wholly uninfluenced by the white race.

Although the desire was to go directly to these eastern Eskimo tribes, the final arrangements sent the expedition west to the Colville with the idea of returning eastward by whaling ship. The latter plan ingloriously miscarried owing to the fact that no whaling vessel visited the region during the whole season, the first time such a thing had occurred during the forty years since ships began to visit there regularly. Thus the expedition was forced to winter in the lower Colville region.

Now it happens that the Colville, which is very poor in game, is not the place one would choose in which to spend a winter. The year before both dogs and Eskimos had starved to death there and many families had moved out. This winter the cold came early, ponds were frozen over in August. The failure of the whaling vessels meant not only inability to get eastward from the Colville but also that the winter must be passed there without sufficient supplies, for only part of the equipment had been taken by way of the Mackenzie, dependence being placed on whaling vessels from San Francisco to get the remainder to the northern camp. The Museum made



MAP TO SHOW THE REGION VISITED BY THE MUSEUM'S ARCTIC EXPEDITION

The expedition spent its first winter, 1908–9, on the Colville west of the Mackenzie, its second in the region of Cape Parry and Langton Bay, east of the Mackenzie. Its important work with Eskimo tribes uninfluenced by the white race is still farther east, on the Coppermine River. Mr. Stefánsson's party started for the Coppermine in April, 1910

repeated and emphatic efforts to get north these supplies. The Museum files show copies of many letters written by Director Hermon C. Bumpus to steam whaling companies, owners of private whalers, captains of freight schooners and of United States revenue cutters, and with these letters courteous responses bearing negative results. Strange chance it seemed that there was no vessel of any sort going to the Far North in the summer of 1909. The negotiations for shipment of supplies went on between the Museum and the West through the winter and early spring. At last it transpired that one steamship whaling company of San Francisco, Messrs. H. Liebes and Company, would send the freight steamer "Herman" to Herschel Island and would carry supplies. That the supplies left San Francisco April 24, 1909, however, did not insure their reaching the expedition, and if the truth must be told, revealing much in regard to Arctic navigation, these same supplies, most of which left New York in the fall of 1908, and all of which left San Francisco in April, 1909, have not yet reached the Museum's expedition or at least had not done so in late spring of 1910 when the last letters were sent out.

The winter on the Colville proved less difficult than had been feared; spring came and the main energies of the summer of 1909 were spent in getting eastward, with much time lost waiting for whalers which never came. Finally Mr. Stefánsson succeeded in getting as far east as Cape Parry, near enough to the Coppermine for a dash there at the opening of the spring of 1910 — if the intervening winter could be successfully passed. It is this winter in the Cape Parry district that has proved the "hard times" winter for the expedition, set forth in the narrative of recent letters.

We landed, Nat-ku-tji-ak, his wife Pan-ni-gáb-luk and I, August 31, by the stranded wreck of the steam whaler "Alexander," lost here in the summer of 1906, ten miles east of Cape Parry. Our first object was to find deer, as we were insufficiently clothed for the winter and had on hand provisions for about two months only. After hunting inland in vain two days, we decided to store most of our stuff in an old house built by some Eskimos who pillaged the "Alexander", and then proceed to Langton Bay to look for deer. We had to transport the things, a little more than a boatload, from where they had been landed on the beach to the house, and while we were loading the second time a southwest wind suddenly blew up. We made a vigorous effort to get to the house, but the beach was rocky there and the surf made a landing impossible. We had to run into shelter in a deep fjord cutting southeast into the land. The southwester continued and we could not get back to the "Alexander," although many articles which we needed badly were there and others a handicap to carry were with us in the boat.

As soon as possible we began edging southwest along the coast, but it was slow work. Paddling a big umiak is slow work under any conditions for three people. A few days of southwest gales would be separated from a few more days of southwest gales by perhaps a half day of calm, but never a breath of fair or land wind. Unfortunately for us we happened to have with us a map of the coast. When on

September 7 we came to a bight in the shoreline which corresponds excellently with one on the map into which the map makers show that a large river empties, we concluded we had reached this river, R. la Ronciére. The formation of the coast simulated well the mouth of a large river. We all agreed that the river must have trees, or at least large willows, as all good-sized rivers do, which would mean game, and it seemed advisable to ascend it. The beach was covered with small spruce drift trees which promised well. I made an entry in my diary to the effect that "R. la Ronciére" differed from most Arctic rivers in that the Lord had put it in the same place as had pleased the map makers.

We ascended and found, sure enough, a river — small, it is true, but we took it for one of the numerous delta channels of a large stream. We went for about five miles farther and came to a small lake. We know now that "R. la Ronciére" does not exist. It took us two days of fair weather to get back to the open sea again, and we finally reached Langton Bay September 13.

At Langton Bay, Mr. Stefánsson and the Eskimos hunted with little success. This was unfortunate because all were short of deerskins. Each person in the Arctics needs at least six deerskins for clothes and three for bedding; in fact a total of nine skins is rather short allowance. By the end of October, considerable anxiety began to be felt concerning the whereabouts of Dr. Anderson who in August had started east in a small boat along the coast, leaving at Herschel Island, boxed and ready for shipment, all specimens collected up to that date. Eventually Mr. Stefánsson and his Eskimo started out to find him, first building a log house with an open fireplace where the Eskimo woman could stay to protect a cache of twenty-two deer. Travelling was difficult but they reached the coast fifty miles west from Langton Bay by November 18. Here they found on the beach an old whale carcass, probably four years old, and spent a day getting a sled-load of blubber before proceeding. They had gone on only a day's journey when they were rejoiced to meet Dr. Anderson with his six Eskimo assistants. The whole party returned to the beach where the frozen whale was and spent the day getting another load of blubber and in talking over the situation.

Dr. Anderson had been traveling under unusual difficulties because having a large party of assistants to make possible the transportation of supplies and collecting equipment. He says respecting this, "Turning Kogmollik has its disadvantages as well as its advantages. Alone I could shoot more game than I drew out of the pot and still have much leisure time for other work. There was certain work to be done, however, which I could not handle alone and diplomatic reasons compelled me to become a communist out and out. This meant a hand to mouth existence for a time with so many to be fed, some worry, and much hard work, but brought my boat and goods to the place where they had to be."

The matter of assistants in the Arctics is a large problem. To hire an

Eskimo means that his family also must be fed and carried along with the expedition. Captain Roald Amundsen is of the opinion that outside of the scientific staff of an expedition Eskimos should best be depended on for all work, his chief reason being not the greater resistance of the Eskimo physically to northern hardships, although that is true also, but that the Eskimo does not get homesick and is not continually down-hearted. The Eskimo's disposition is such that whether he be cold, hungry or in danger he seldom becomes dispirited or sulky. Commander Peary has always spoken in favor of Eskimo assistants and has always shown his personal preference in being accompanied by them on his dashes for the Pole. Mr. Stefánsson who had previously spent a year with the uncivilized Eskimo agreed with this opinion in favor of the Eskimo and the Museum's Arctic Expedition was planned accordingly. He reports, however, a wonderful change in the Eskimos as regards pay for services since he was at the Mackenzie delta in 1906. "Then they knew little about money and one could hardly pay for anything. He might make gifts, but pay was never asked and if offered needed explaining by the statement that white men always pay for food and work in their own country. So great is the change that now an Eskimo seldom remains permanently satisfied with the most liberal pay for services."

While the reunited divisions of the expedition worked getting a store of blubber, the leaders reviewed the past and carefully studied the future. One thing was certain, they must have the traps and ammunition that had been left perforce in the old house beside the wrecked "Alexander." Black and silver fox had recently been seen, black fox with a value from six hundred to a thousand dollars per skin. Besides there could be no more opportune time to get the things necessary for the Coppermine trip which would begin in the spring as soon as the sun came back. It was, therefore, decided that Dr. Anderson with two Eskimos and ten dogs should go at once to the "Alexander." The day they separated was one of the worst of the year,— 35° with a southwest blizzard. Going east with the storm, Dr. Anderson could proceed; going toward the west and so in the face of the gale, Mr. Stefánsson's dogs refused to work, and waiting was necessary till the storm abated. At last they started, six people with two days' provisions, and after fifteen days of struggle they got back to the log house where they had left the Eskimo woman in charge of the cache. Nothing could be more graphic than Mr. Stefánsson's description of these fifteen days:

> On the whole trip we killed five ptarmigan and not a single rabbit, though one of us hunted each bank all the way up. The sun was gone and so the daylight was meagre, besides it blew a blizzard every day. The whale tongue was very bad eating,

it had little to it but dry fibres and was strongly impregnated with sea salts (other than NaCl). When we had finished this we were really better off for the stuff seemed to make us sick. We then ate sealskin, some deerskin we had along for sole leather and our snowshoe lashings, in fact every edible thing except clothes. Fortunately we had seal oil. With about a cupful of oil a day one does not feel in the least hungry but lazy, sleepy and weak. All of us found it a little difficult to take the oil straight. We soaked it up in tea leaves, deerskin with long hair on it and ptarmigan feathers.

Before they reached the end of these fifteen days some of the Eskimos were taken sick, and did not recover for weeks. These were indeed most discouraging times. Mr. Stefánsson was not able to go far from the camp because of the sick Eskimos, there were seven people and six dogs to feed, meaning a consumption of rather more than a deer per day, while there was no light but dim twilight for hunting, and every southeast wind brought fog, every southwest wind, a blizzard. To add to other causes for depression all were feeding wholly on lean meat in Arctic cold where health and spirits depend on the presence of fat in the food. Also it was at this time that the oil for lights gave out:

At this time we had left only about a quart of oil, which was soon gone and we were without lamplight all the time the sun was away. This was especially inconvenient for the women, as sewing in the dark is difficult. There was more than once a whole week, too, when I made no entry in my diary because I could not see. One could write for about two hours at noon, but I was usually hunting at that time, always starting out before daybreak.

In addition, we were getting badly worried over the non-arrival of Anderson and his party. They should have been home by Christmas. We were especially afraid that on the very day they left us in the blizzard they might have ventured too far off shore on the ice and have been carried with it to sea. The sick Eskimos were growing despondent. I used to see deer almost every clear day (there was fog or blizzard two days out of three) but on the clear days it was so absolutely breathlessly calm that deer could hear you and you could hear them from a quarter to a half mile away. I therefore never got a shot at them. An Eskimo always looks upon such protracted ill luck as caused supernaturally. Taboos had been violated. They knew I had eaten deermeat the day I killed a wolf, but worse than that they knew of more than one case of my breaking the Sabbath. They were therefore certain they should never be able to get any deer. One day, however, I shot a fawn. This seemed to break the spell to the notion of the Eskimos.

In early January lack of food made some sort of a venture necessary, so a start was made for Langton Bay. Here they found the cache of blubber broken into by a wolverine which had eaten a hole through a two-inch plank. Small consolation was gained by the fact that they caught the wolverine, although it was excellent eating after its high living on deer meat and bear meat. Disappointed here, there was nothing to do but keep on to the "Alexander"; reaching the old house by the wreck they

were astounded to find Dr. Anderson and one of his Eskimos there, recovering from pneumonia. Fortunately flour had been among the supplies left at the house or the men never could have lived through. Fortunately too, polar bears have no appetite for flour. When Dr. Anderson arrived at the house he found that bears had broken in and devoured four boxes (500 lbs.) of whale blubber, two slabs of bacon, spilled a ten-gallon can of alcohol and "knocked things about generally"; but the flour they had not disturbed.

The letters report that in March all were "in fit condition, showing no serious after-effects," and that Mr. Stefánsson was expecting to start with his party during the first week in April for the Coppermine.

The expedition is planning to come out of the field soon, and great interest at the Museum attaches to the time when the full results of the work will be known. Making a zoölogical survey in the Arctics is a peculiarly difficult task due largely to problems of transportation of outfit and accumulating specimens; and the collections with duplicate series which the expedition reports will be of great scientific value. With the close of this expedition, Mr. Stefánsson will have five years' knowledge of the Eskimo. He has accomplished much in getting records of songs and short tales, working to ascertain definitely the presence and variations of certain folk tales throughout the tribes. He has complete lists of words used by the Shamans in ceremonials; and he has a large series of head measurements and many photographs. All results of the expedition will possess unusual value, representing as they do, work accomplished in spite of the almost insuperable obstacles set by the Arctic winter and by the necessity of "turning Kogmollik."

MUSEUM NEWS NOTES

THE near future promises rapid development in the Museum's instruction for the blind owing to the Jonathan Thorne Memorial Fund. The work is under the supervision of the Department of Public Education which has long had an interest in Museum instruction for the blind, but outside of its regular lecture courses could do little because all permanent exhibits are of necessity within glass cases. It is hoped that future plans will allow close coöperation with the teachers of the blind throughout the city and that the unusual advantages which the Museum can give in the free handling of duplicate specimens from its store-rooms will be found valuable training for blind children. It is desired even that the Museum

shall extend the work beyond its own doors, sending out to the blind study collections well labeled in both New York Point and American Braille, following here the plan of small travelling museums employed in coöperation with the city schools where 900,000 children were reached during the past year.

An expedition under Mr. Walter Granger of the Department of Vertebrate Palæontology in searching for fossil remains in the Big Horn Valley, Wyoming, has discovered in the Lower Eocene a complete skeleton of the ancestral horse, a small four-toed species. The skeleton has been taken up in a block of sandstone, and after the block arrives at the Museum, chipping the rock away from about the bones will proceed at once. The great fact is that this skeleton was found in the Lower Eocene, being the first record for this formation, which is older than any that has before yielded a complete horse skeleton. The specimen must, therefore, carry evolutionary history farther into the past than skeletons previously obtained, and when fully exposed, is likely to be found approximating more nearly a hypothetical five-toed ancestor of all horses.

A Teachers' Day has been planned by the Museum authorities. Delegates from all the schools have been invited to be present on Saturday, November 5, from two to five-thirty o'clock. Special guides will be on hand to conduct the teachers through the exhibition halls and especially through the laboratories and workrooms which are not open to the public. The program includes ten-minute illustrated talks by the Curators of the Museum and a general meeting at which brief addresses will be made by Professor Henry Fairfield Osborn, President of the Board of Trustees, Dr. William H. Maxwell, Superintendent of the Public Schools, and other educators. A reception will follow these addresses.

The Horticultural Society of New York will hold its fall exhibition in the Museum from November 9 to 13. The exhibition will be open especially for the members of the Society and for Museum and affiliated organizations on Wednesday evening from 7 to 10 o'clock. It will be open to the general public on Thursday, Friday and Saturday from 9 A. M. to 5 P. M. and from 7 to 10 P. M., also on Sunday from 1 to 5 P. M.

Miss Mary Lois Kissell of the Department of Anthropology left New York October 28 for an extended period of field observation among some of the Indian tribes of the Southwest. Miss Kissell will devote her time to a study of the basket work and textiles of these tribes paying especial attention to the origin and significance of designs.

Dr. R. Broom, the leading authority on the Permian vertebrates of South Africa and collecting there for this Museum, has recently announced the discovery of a fossil skeleton of *Delphinognathus*, a large and aberrantly specialized extinct reptile, related to the group of Theriodonts. These latter forms are believed to stand rather near the borderland between reptiles and mammals. The accession is important because there is very little South African material in the Museum.

The Seventeenth Congress of Americanists in accordance with an adjournment taken in Buenos Aires in May reassembled in Mexico City, September 7 and continued its sessions until September 14. These congresses meet biennially, alternating between Europe and America. This meeting of the Congress in reality formed a part of the Mexican centennial which continued throughout the month of September. The papers presented dealt for the most part with various subjects concerning Mexican archæology and ethnology and were read by leading anthropologists. Europe was represented by Dr. Edward Seler, Berlin, the president of the Congress; Dr. Francois Heger, Vienna; Professor Capitan, Paris; and Professor Moguel, Madrid. From the United States there were in attendance, Drs. Dixon and Tozzer of Harvard, Dr. MacCurdy of Yale, Dr. Boas of Columbia, Dr. Gordon of Philadelphia, Dr. Hrdlicka of Washington, Professor Starr of Chicago and Mr. Stansbury Hagar of New York. Drs. Goddard and Spinden were delegates from the American Museum.

Public meetings of the New York Academy of Sciences and its Affiliated Societies will be held at the Museum according to the usual schedule. Programmes of meetings are published in the weekly *Bulletin* of the Academy.

LECTURE ANNOUNCEMENTS

MEMBERS' COURSE

The first course of illustrated lectures for the season 1910–1911 to Members of the Museum and to persons holding complimentary tickets presented to them by Members will be given in November and December.

Thursday evenings at 8 : 15 o'clock. Doors open at 7 : 45.

November 17 — Prof. Charles-Edward Amory Winslow, "Insect-Carriers of Disease."

Professor Winslow has been engaged for some years in the study of problems of water supply, sewage disposal and other phases of municipal sanitation. His lecture

will deal with the important discoveries made during the last decade in connection with the spread of typhoid fever, malaria and yellow fever through the agency of flies and mosquitoes and with the recent achievements of sanitation in controlling these diseases.

December 1 — Mr. Frank M. Chapman, "From Sea-level to Snow-line in Vera Cruz, Mexico: A Study of the Distribution of Bird-life as it is Controlled by Altitude."

Mr. Chapman worked on Mt. Orizaba from the coastal lagoons (where moving pictures were secured of the rare roseate spoonbill) and the luxuriant forests of the lowlands upward to the magnificent pine and spruce forests with their snowbirds and crossbills, characteristic of the Canadian zone.

December 8 — Mr. James L. Clark, "Snap Shots from British East Africa."

Mr. Clark, a successful sculptor and taxidermist, has returned recently from a fourteen months' stay in British East Africa. While there he obtained a splendid series of pictures of the big game of the country, as well as of the picturesque natives, and besides had some most unusual adventures, for example, at one time he was treed by a herd of two hundred elephants.

December 15 — Dr. Pliny E. Goddard, "Nomadics of the Southwest."

Through the generosity of Mr. Archer M. Huntington, the Museum for the past two years has been maintaining expeditions in the Southwest for the purpose of making an exhaustive study of the Indian tribes there and of their relationships. Dr. Goddard has spent several months among these Indians, and will give an account of his experiences and observations.

December 22 — Mr. Roy C. Andrews. Subject to be announced.

Mr. Andrews of the Museum staff has recently spent six months at the whaling stations on the eastern coast of Japan and has secured a number of large whale skeletons for the Museum. Many of his photographs are remarkable.

PUPILS' COURSE

These lectures are open to the pupils of the public schools when accompanied by their teachers and to the children of Members of the Museum on presentation of Membership tickets. Lectures begin at 4 P. M.

	Oct.	Nov.	
Monday,	24	14	— "New York City: Past and Present." By Mr. Roy W. Miner.
Wednesday,	26	16	— "Insects and Health." By Prof. C–E. A. Winslow.
Friday,	28	18	— "Forests and their Uses." By Mrs. A. L. Roesler.
Monday,	31	21	— "Scenes in Peru, Bolivia and Brazil." By Dr. Louis Hussakof.

Nov.
Wednesday, 2 30 — "Alaska and its Indians." By MR. HARLAN I. SMITH.
Dec.
Friday, 4 2 — "Children of all Nations." By MRS. A. L. ROESLER.
Monday, 7 5 — "Transportation: Past and Present." By MR. WALTER GRANGER.
Wednesday, 9 7 — "A Trip to Europe." By DR. LOUIS HUSSAKOF.
Friday, 11 9 — "Life on the Plains." By MR. BARNUM BROWN.

PEOPLES' COURSE

Given in coöperation with the City Department of Education.

Tuesday evenings at 8 : 15 o'clock. Doors open at 7 : 30. Illustrated.

November 1 — "Naples: Its Environs and Vesuvius." By MR. ARTHUR STANLEY RIGGS.
November 8 — "Southeastern Italy: The Sorrentine Peninsula and its Place in History." By MR. ARTHUR STANLEY RIGGS.
November 15 — "Twentieth Century Sicily: The Modern Garden of Eden." By MR. ARTHUR STANLEY RIGGS.
November 22 — Subject and lecturer to be announced.
November 29 — "Holland's War with the Sea." By JAMES H. GORE, LL. D.

Saturday evenings at 8 : 15 o'clock. Doors open at 7 : 30. Illustrated.

November 5 — "The Humming Bird's History." PROF. S. C. SCHMUCKER.
November 12 — "The Mind of the Apes." PROF. S. C. SCHMUCKER.
November 19 — "The Living and the Non-living." By MR. BENJAMIN C. GRUENBERG.
November 26 — "Life Aggressive: Utilizing the Environment." By MR. BENJAMIN C. GRUENBERG.

The American Museum Journal

MARY CYNTHIA DICKERSON, *Editor.*

FRANK M. CHAPMAN,
LOUIS P. GRATACAP,
WILLIAM K. GREGORY. } *Advisory Board.*

Subscription, One Dollar per year. Fifteen cents per copy.

A subscription to the JOURNAL is included in the membership fees of all classes of Members of the Museum.

Subscriptions should be addressed to The American Museum Journal, 30 Boylston St., Cambridge, Mass., or 77th St. and Central Park West, New York City.

Entered as second-class matter January 12, 1907, at the Post-office at Boston, Mass. Act of Congress, July 16, 1894.

Scientific Staff

DIRECTOR

HERMON CAREY BUMPUS, Ph.D., Sc.D., LL.D.

DEPARTMENT OF GEOLOGY AND INVERTEBRATE PALÆONTOLOGY

EDMUND OTIS HOVEY, A.B., Ph.D., Curator

DEPARTMENT OF MINERALOGY

L. P. GRATACAP, Ph.B., A.B., A.M., Curator
GEORGE F. KUNZ, A.M., Ph.D., Honorary Curator of Gems

DEPARTMENT OF INVERTEBRATE ZOÖLOGY

Prof. HENRY E. CRAMPTON, A.B., Ph.D., Curator
ROY W. MINER, A.B., Assistant Curator
FRANK E. LUTZ, A.B., A.M., Ph.D., Assistant Curator
L. P. GRATACAP, Ph.B., A.B., A.M., Curator of Mollusca
WILLIAM BEUTENMÜLLER, Associate Curator of Lepidoptera

Prof. WILLIAM MORTON WHEELER, Ph.D., Honorary Curator of Social Insects
ALEXANDER PETRUNKEVITCH, Ph.D., Honorary Curator of Arachnida
Prof. AARON L. TREADWELL, B.S., M.S., Ph.D., Honorary Curator of Annulata

DEPARTMENT OF MAMMALOGY AND ORNITHOLOGY

Prof. J. A. ALLEN, Ph.D., Curator
FRANK M. CHAPMAN, Curator of Ornithology
ROY C. ANDREWS, A.B., Assistant in Mammalogy
W. DE W. MILLER, Assistant in Ornithology

DEPARTMENT OF VERTEBRATE PALÆONTOLOGY

Prof. HENRY FAIRFIELD OSBORN, A.B., Sc.D., LL.D., D.Sc., Honorary Curator
W. D. MATTHEW, Ph.B., A.B., A.M., Ph.D., Acting Curator
WALTER GRANGER, Assistant Curator of Fossil Mammals
BARNUM BROWN, A.B., Assistant Curator of Fossil Reptiles
LOUIS HUSSAKOF, B.S., Ph.D., Assistant Curator of Fossil Fishes

DEPARTMENT OF ANTHROPOLOGY

CLARK WISSLER, A.B., A.M., Ph.D., Curator
PLINY E. GODDARD, A.B., A.M., Ph.D., Associate Curator
HARLAN I. SMITH, Associate Curator
ROBERT H. LOWIE, A.B., Ph.D., Assistant Curator
HERBERT J. SPINDEN, A.B., A.M., Ph.D., Assistant Curator
CHARLES W. MEAD, Assistant
ALANSON SKINNER, Assistant

DEPARTMENT OF PHYSIOLOGY

Prof. RALPH W. TOWER, A.B., A.M., Ph.D., Curator

DEPARTMENT OF PUBLIC HEALTH

Prof. CHARLES EDWARD AMORY WINSLOW, S.B., M.S., Curator

DEPARTMENT OF WOODS AND FORESTRY

MARY CYNTHIA DICKERSON, B.S., in charge

DEPARTMENT OF BOOKS AND PUBLICATIONS

Prof. RALPH W. TOWER, A.B., A.M., Ph.D., Curator

ANTHONY WOODWARD, Ph.D., in charge of Maps and Charts

DEPARTMENT OF PUBLIC EDUCATION

Prof. ALBERT S. BICKMORE, B.S., Ph.D., LL.D., Curator Emeritus
GEORGE H. SHERWOOD, A.B., A.M., Curator

THE AMERICAN MUSEUM
OF
NATURAL HISTORY

FOR THE PEOPLE
FOR EDVCATION
FOR SCIENCE